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REPORT

CD NO.

COUNTRY USSR

SUBJECT Scientific -- Geophysics, oceanography

HOW PUBLISHED Thrice-weekly newspapers; weekly, monthly periodicals

WHERE PUBLISHED Monthly periodic
Moscow, Leningrad

DATE
PUBLISHED May-20 Nov 1955

LANGUAGE : Russian

DATE OF INFORMATION	1954-1955
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DATE DIST. 20 Feb 1956

NO. OF PAGES 6

SUPPLEMENT TO
REPORT NO.

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Work of MV Vityaz'

In recent times, studies on the depth of oceans have occupied the scientists of many countries, including the USSR. Of particular interest are the deep-water depressions, 19 of which are known with depths over 7,000 meters.

Writing in Vodnyy Transport (Moscow, 8 September 1955), Correspondent B. Georgiyev presented the following review of work done in this field by the MV Vityaz', the expeditionary ship of the Institute of Oceanology, Academy of Sciences USSR:

"Beginning in 1949, the Vityaz' has been operating in the seas of the Far East and the northwestern part of the Pacific Ocean. Scientists aboard the ship have carried out a broad program of research and have made a number of geographical and biological discoveries of great significance for oceanography, marine geology, navigation, and fishing.

"The Vityaz' carries the latest equipment for all types of research in any part of the ocean. This equipment includes a deep-water anchoring installation which permits the ship to anchor in depths up to 10,000 meters and a trawling installation for trawling at any desired ocean depth. A variety of winches is provided for deep-water hydrological, geological, and hydrobiological observations. Scientists operating from the vessel have at their disposal deep-water bottom scoops, seismoacoustical apparatus, and other modern equipment in addition to 14 fully equipped laboratories.

"The Vityaz' has completed 20 voyages totaling 130,000 miles in the Pacific Ocean during her 6 years of operating there, and Soviet scientists aboard the vessel have made more than 200,000 different hydrological, geological, biological, and chemical observations. The expeditions over the years have determined that the southwestern part of the Bering Sea is divided into two parts by the Submarine Range imeni Akademik P. P. Shirshov. Expeditions of the Vityaz' have

- 1 -

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studied the deep-water depression to the east of the Kuriles and Kamchatka exhaustively for the first time. A complex expedition under the direction of L. A. Zenkevich found that the Kurile-Kamchatka Depression, with depths in excess of 9 kilometers, stretches for more than 500 kilometers as a narrow trench with a maximum width of 5 kilometers. Maximum depth found was 10,382 meters."

1955 Voyages

In the summer of 1955, the Vityaz' completed two research voyages in the northwestern part of the Pacific Ocean, sailing a total of about 15,000 miles. V. Petelin, chief of the oceanographic expedition aboard the Vityaz', reported the following information about these activities in Vodnyy Transport (13 October 1955):

"In the summer of 1955, there were representatives of all branches of oceanography aboard the Vityaz'. They included: Prof T. S. Pass, ichthyologist; Doctor of Chemistry E. A. Ostroumov; Candidate of Biological Science G. M. Belyayev; Candidate of Biological Science A. I. Savilov; Candidate of Geographical Science, V. A. Burkov, hydrologist; and Engr H. L. Zenkevich. The ship is under the command of Captain I. V. Sergeyev.

"In the southern part of the area studied, complex observations were carried out to clarify the structure and dynamics of water masses in the cold sub-Arctic and warm subtropical water regions and the interchange between these zones. The expedition studied chemical composition of these waters, bottom relief of the areas, bottom cover materials, etc. The border between the warm and cold waters apparently moved considerably to the south since the Vityaz' was in the area last year. Simultaneously, flying fish, squid, saury, and other fish inhabiting the upper water layers have also moved to the south.

"The expedition made numerous bottom trawls to raise samples of bottom fauna and net drags for deep-water fish. These trawls and nets were employed at various depths including the maximum (7,500 meters) found in the Japanese Depression.

"The fauna of the Japanese Depression proved to be very similar to the fauna of the Kurile-Kamchatka Depression studied by Soviet scientists under the direction of Prof L. A. Zenkevich. There were only small differences found, and these were dictated by the geographic positions of the two areas.

"On the western slope of the Japanese Depression, glauconite was found in the bottom sediment, indicating the existence of special physical-chemical conditions on the ocean floor there. These conditions have not yet been sufficiently studied, but such studies are necessary for clarifying sediment formation and attendant formation of minerals in the seas of the geologic past.

"Soundings by sonic depth finder have established the presence of numerous submarine mountains in the Pacific rising almost 3,000 meters from the ocean floor.

"Additional information has also been gathered on the extent of red clay in the area. These clays are found as a fine clay sedimentation permeated with oxidized iron and manganese which impart the cinnamon color to it. In some localities, the red clay contains large nodules of iron and manganese oxides usually arranged in round or other solid formations. Accumulations of large pumice blocks have also been observed, apparently the product of underwater volcanic eruptions.

"In the most southeasterly corner of the area studied, massive concentrations of Siphonophora were encountered on the ocean surface.

- 2 -

C-O-N-F-I-D-E-N-T-I-A-L

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"Complex research was carried out by the expedition in the northern part of the Pacific Ocean for the first time, and the results of the hydrological, hydrochemical, and hydrobiological observations made are of great importance for the fishing industry. Of special interest are the data on distribution and routes of seasonal migrations of the Far East salmon.

"For the first time in these areas, currents were surveyed by electromagnetic gauge, an instrument which operates on the basis of changes in intensity of the earth's magnetic field in relation to water mass dynamics. A great deal of methodological work done by K. V. Moroshkin (one of the senior members of the Vityaz' expedition) has shown that observations with these instruments are extremely accurate.

"Research done in the western part of the Aleutian Depression, where maximum depths of 7,500 meters were found, is also of great scientific interest. For the first time there, an entire division of the expedition made observations and gathered materials on bottom relief, bottom sedimentation, fauna on the bottom and at various water levels, and hydrology-hydrochemistry of the water in the depression. The Aleutian Depression is morphologically very similar to other deep-water depressions. It has exceedingly steep sides (45-degree slope in some places) indicating its fault origin. The bottom plane of the depression does not exceed 10 kilometers in width.

"Bottom fauna are very similar to the bottom fauna of the Kurile-Kamchatka and Japanese depressions. In the waters of the Aleutian Depression, an abundance of deep-water fish were noted -- principally black Macruridae, which also inhabit the other depressions.

"On the bottom of the western part of the Aleutian Depression and in the northern part of the Kurile-Kamchatka Depression, the existence of a widely distributed, unusual clay sedimentation was established. This sedimentation originated with slides from the depression slopes during underwater earthquakes. In recent voyages aboard the Vityaz', the study of bottom relief in the areas of underwater earthquakes and the waves connected with them has been one of the work divisions of the expedition.

"To study the ebb and flow of currents, 16 daily stations were taken under the direction of Hydrologists V. A. Shirey and V. A. Burkov while the ship was at anchor in depths up to 3,000 meters. Anchorage was maintained at these times in winds of force 7 and even force 8.

"An extension of the Hawaiian Submarine Range was found far to the north running from the Hawaiian Islands to the Submarine Elevation imeni Akademik V. A. Obruchev which is located at the point where the Aleutian and Kurile-Kamchatka depressions meet. Sonic soundings indicate that the Hawaiian Submarine Range divides in the north. Branches of it run to the Submarine Elevation imeni Akademik V. A. Obruchev and to the Aleutian Depression in the area of the Aleutian Islands. The top of the range rises 2,500-3,000 meters above the ocean floor and its surface is covered with Globigerina silt.

"Engr H. L. Zenkevich has done interesting work on underwater photography to depths of 2,860 meters using a camera he designed himself. Many photographs were obtained of the ocean bottom and bottom fauna."

Petelin concluded his 13 October 1955 article by noting that the Vityaz' was once again in the Pacific Ocean.

- 3 -

C-O-N-F-I-D-E-N-T-I-A-L

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50X1-HUM

Deep-Water Anchoring

Speaking of this same autumn voyage, Vodnyy Transport (17 September 1955) noted that the Vityaz' navigator, Avramenko, and Boatswain Yurov had anchored the ship in 1,300 meters of water during winds of force 9. The article also stated that an atlas of currents, depths, and bottom relief was being prepared on the basis of information gathered by the Vityaz'. (For a complete technical description of the Vityaz' see FDD Summary 656, page 23.)

Repeated reports from Soviet periodicals that the Vityaz' is equipped to anchor at depths up to 10,000 meters and has actually anchored at depths up to 3,000 meters are of particular interest. A schematic drawing of the deep-water anchoring installation, together with general layout drawings of the ship, is appended to this report. These drawings appeared in the Moscow periodical Morskoy Flot, No 5, May 1955.

It should be noted that such deep-water anchoring has been reported by a number of writers in a number of newspapers and periodicals -- this is not an isolated report.

Other Expeditions

Leningradskaya Pravda on 29 June 1955 reported the following on oceanographic research in the Baltic:

"A month ago, the research ship Professor Rudovits sailed from Leningrad for the Baltic Sea on her eighth voyage. Eight members of the Leningrad Division of the State Institute of Oceanography (to which the ship belongs) and three students from the Higher Marine Engineering School imeni Admiral Makarov are aboard.

"The basic task of this group is to gather data for further research on the long range and seasonal changes in the hydrological regime of the Baltic Sea.

"Hydrochemist N. M. Pastukhova, Hydrologist I. P. Lazareva, Engr V. I. Meshcherskiy, and Technician Ye. I. Ramodin are taking part in the expedition."

The following information was reported by the periodical Ogonek (Moscow, No 47, 20 November 1955) on hydrographic and hydrobiologic research in the Rybinsk Reservoir:

"The 'Borok' biological research station of the Academy of Sciences USSR is located on one of the many capes which jut out into the Rybinsk Reservoir. Three years ago there was only a small group of people working there with the task of studying the influence of the water on agricultural expansion in the area. Under the direction of Ivan Dmitriyevich Papanin, however, the biological station has been transformed in function to a scientific research institute employing the most modern equipment and instruments and carrying out many types of scientific work. The station workers are studying the biological composition of the reservoir and have compiled a great deal of data on the reservoir's life through microbiologic, hydrologic, and ichthyologic observations.

"There are more than 200 persons attached to the station, including 76 scientific workers. The station has a fleet of research ships, the most notable of which are the Akademik Morozov, the Akademik Nesmeyanov, and the Akademik Oparin.

- 4 -

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"The research area served by this station has grown, and the members of the station now make expeditions to other lakes and reservoirs along the Volga."

The following illustrations were included in the Oronok article: Village Where Station Members Live [CIA Photo Accession No 188474], Expeditionary Ship Akademik Sharin [150577], Plankton "Torpedo" Being Lowered Over the Side [150578], Installatic: Employed for Measuring radioactivity of Algae Using Marked Atoms [150579]

Fig 1. Side View -- Vityaz'

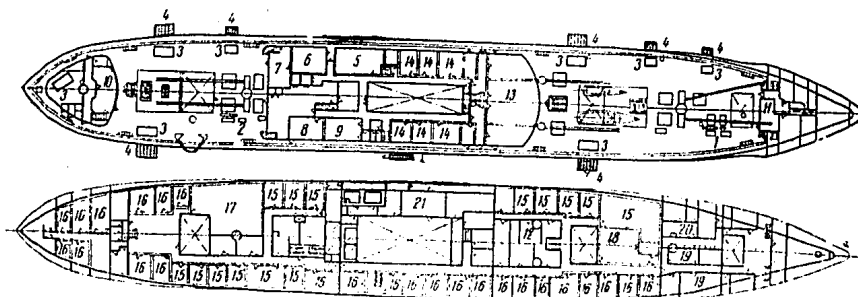
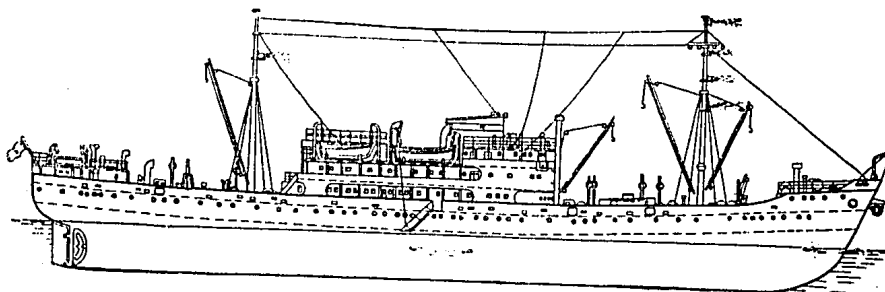


Fig 2. Upper and Second Decks

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|-------------------------------|---|
| (1) anchor winch | (12) photo laboratory |
| (2) trawl winch | (13) crew cabins |
| (3) oceanographic winch | (14) officer quarters |
| (4) chains | (15) quarters for junior scientific personnel |
| (5) hydrologic laboratory | (16) crew's quarters |
| (6) plankton laboratory | (17) crew's mess |
| (7) ichthyologic laboratory | (18) recreation room |
| (8) geologic laboratory | (19) experimental shops |
| (9) chemical laboratory | (20) lazarette |
| (10) benthos laboratory | (21) shop |
| (11) hydrochemical laboratory | |

- 5 -

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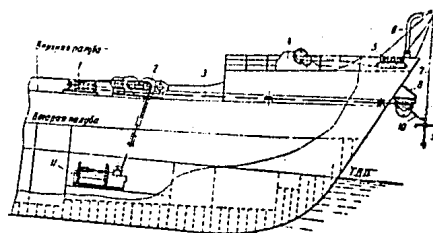


Fig 3: : Vityaz' Deep-Water Anchor Installation

- (1) shock absorber, (2) deep-water anchor winch,
- (3) anchor cable (line), (4) windlass for regular
- anchor, (5) roller equipped fairlead, (6) crane,
- (7) fall, (8) block, (9) anchor, (10) 6-meter shot
- of chain, (11) cable reel

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- 6 -

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